

Remarks

Consideration of this Application is respectfully requested.

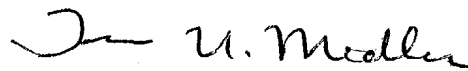
Upon entry of the foregoing amendment, claims 19, 20, 27-29 and 30-34 are pending in the application, with 19, 27 and 30 being the independent claims. Claims 19, 20, and 27 have been amended. Further, a clean version of claims 28 and 29 is included in compliance with 37 C.F.R. §1.121(c)(3). Claims 30-34 have been added. The amendment of the specification and revision to Figure 3 address rejections made by the Examiner during the prosecution of the parent application, *i.e.*, U.S. Appl. No. 09/534,573, filed March 25, 2000 (allowed). These changes are believed to introduce no new matter, and their entry is respectfully requested.

Qiu et al.
Appl. No. To be assigned
(Divisional of U.S. Appl. No. 09/534,573;
filed: March 27, 2000)

Prompt and favorable consideration of this Preliminary Amendment is
respectfully requested.

Respectfully submitted,

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Version with markings to show changes made

Claims 19, 20 and 27 have been amended as follows.

19. (Amended) A method for manufacturing a piezoelectric element having a piezoelectric material with a perovskite crystal structure expressed by the formula ABO_3 in which the symbol A represents at least an element "a", comprising the steps of:

- a) forming a lower electrode;
- b) forming over the lower electrode a film of the [a] piezoelectric material

[exhibiting piezoelectricity by the method of manufacturing a piezoelectric material according to Claims 1-7] having a perovskite crystal structure expressed by the formula ABO_3 in which the symbol A represents at least an element "a" by,

a first step of producing an oxide in an amorphous state containing an element "a" and subjecting the oxide to a hydrothermal process using an aqueous solution containing the element "a" thereby crystallizing the oxide, wherein the oxide produced in the first step is a piezoelectric material having a perovskite crystal structure expressed by the formula ABO_3 in which the symbol A represents at least an element "a"; and

a second step of producing a piezoelectric material by subjecting the oxide produced in the first step to a hydrothermal process using an aqueous solution containing the element "a", so as to increase the amount of the element "a" contained in the piezoelectric material due to its substitution for element "a" contained in the oxide produced in the first step; and

- c) forming an upper electrode over the piezoelectric material formed in step
b.

20. (Amended) A method of forming an ink-jet recording head, comprising the steps of:

forming a diaphragm film over a substrate;

manufacturing a piezoelectric element over the diaphragm film by the method for
manufacturing a piezoelectric element according to [any of Claims 1 to 7] claim 19; and

working the substrate to form [and forming] a pressurization chamber at a site
capable of transmitting displacement of the diaphragm film produced by driving of the
piezoelectric element.

27. (Amended) A piezoelectric element comprising:

a [the] piezoelectric material [according to Claim 25 or 26] expressed by the
chemical formula (Ba,Pb)TiO₃, wherein the piezoelectric material is composed of
acicular crystals having dislocation layers in which lattice defects are present and
wherein the spacing between adjacent dislocation layers is at least 10 nm; and

electrodes with which voltage can be applied to said [this] piezoelectric material.

Claims 30-34 were added to the application.